Amendment and Response Under 37 C.F.R. 1.116
Applicant: Raymond H. Kraft
Serial No.: 10/800,420
Filed: March 12, 2004
Docket No.: A126.253.102
Title: SYSTEM AND METHOD OF NON-LINEAR GRID FITTING AND COORDINATE SYSTEM MAPPING

IN THE CLAIMS

Please amend claims 1 and 16 as follows:

1.(Currently Amended)   A method of fitting acquired fiducial data to a set of fiducials on a
fiducial plate; said method comprising:

> fitting a fiducial grid model to data acquired by an imaging apparatus captured such that
>> features are positioned in space relative to the fiducial plate;

> establishing a conversion from acquired coordinates to ideal fiducial coordinates using a
>> data processing component;

> calculating an absolute location of identified acquired image feature centers relative to
>> the fiducial plate in fiducial plate coordinates using the data processing
>> component, the absolute location indicating a distance measurement in fiducial
>> plate coordinates; and

> based on at least one calculated absolute location of the identified acquired image feature
>> centers, selectively modifying a structure represented by the identified acquired
>> image feature center.

2.(Previously Presented)   The method of claim 1 wherein said fitting comprises identifying
fiducial coordinates for each fiducial captured in said data acquired by said imaging apparatus.

3.(Original)   The method of claim 2 further comprising selectively iterating said identifying
coordinates for each fiducial and said calculating an absolute location of identified acquired
image feature centers.

4.(Original)   The method of claim 1 wherein said calculating comprises utilizing a linear least
squares operation.

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5.(Original)   The method of claim 1 further comprising assuming that a rotation of said imaging apparatus relative to a fiducial grid is negligible.

6.(Original)   The method of claim 1 wherein said imaging apparatus comprises a charge-coupled device camera.

7.(Original)   The method of claim 1 wherein said imaging apparatus comprises a complementary metal-oxide semiconductor device.

8. – 15.(Cancelled)

16.(Currently Amended)   A computer readable medium encoded with data and instructions for fitting acquired fiducial data to a set of fiducials on a fiducial plate; said data and said instructions causing an apparatus executing said instructions to:

    fit a fiducial grid model to data acquired by an imaging apparatus captured such that
        features are positioned in space relative to the fiducial plate;
    establish a conversion from acquired coordinates of each identified fiducial to ideal plate
        coordinates; and
    calculate an absolute location of identified acquired image feature centers relative to the
        fiducial plate, the absolute location indicating a distance measurement in fiducial
        plate coordinates.

17.(Original) The computer readable medium of claim 16 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to identify fiducial coordinates for each fiducial captured in said data acquired by said imaging apparatus.

18.(Original) The computer readable medium of claim 17 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said

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instructions selectively to iterate identifying coordinates for each fiducial and calculating an absolute location of identified acquired image feature centers.

19.(Original) The computer readable medium of claim 16 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to utilize a linear least squares operation.

20.(Original) The computer readable medium of claim 16 further encoded with data and instructions; said data and said instructions further causing an apparatus executing said instructions to assume that a rotation of said imaging apparatus relative to a fiducial grid is negligible.

21.(Withdrawn) The method of claim 3 wherein selectively iterating comprised performing multiple iterations of identifying coordinates and calculating an absolute location of identified acquired image feature centers for at least some of the fiducials.

22.(Withdrawn) A method of fitting acquired fiducial data to a set of fiducials on a fiducial plate, said method comprising:

    positioning features relative to the set of fiducials on the fiducial plate;

    acquiring image data of the features and the set of fiducials indicative of the features
        positioned relative to the set of fiducials using an imaging apparatus;

    establishing a conversion from acquired coordinates to ideal fiducial coordinates; and

    calculating an absolute location of identified acquired image feature centers relative to
        the set of fiducials in fiducial plate coordinates.

23.(Withdrawn) The method of claim 22 wherein said fitting comprises identifying fiducial coordinates for each fiducial captured in said data acquired by said imaging apparatus.

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24.(Withdrawn)   The method of claim 23 further comprising selectively iterating said identifying coordinates for each fiducial and said calculating an absolute location of identified acquired image feature centers.

25.(Withdrawn)   A probe card testing system, said system comprising:

      a fiducial plate having a set of fiducials positioned thereon;

      an imaging apparatus adapted to acquire image data of the fiducial plate and features positioned relative to the set of fiducials; and

      a data processing component adapted to receive the acquired image data from the imaging apparatus, fit a fiducial grid model to the acquired image data, establish a conversion from acquired coordinates to ideal fiducial coordinates and calculate an absolute location of identified acquired image feature centers relative to the fiducial plate in fiducial plate coordinates.

26.(Withdrawn)   The system of claim 25 wherein the fiducial plate comprises a substantially transparent substrate and the features are formed on a probe card positioned relative to the fiducial plate.

27.(Withdrawn)   The system of claim 25 and further comprising:

      a stage coupled to the imaging apparatus and adapted to move the imaging apparatus in a plane that is substantially parallel to the fiducial plate.

28.(Withdrawn)   The system of claim 25 wherein the data processing component is further adapted to identify fiducial coordinates for each fiducial in the acquired image data.